

ACN Project Proposal

Title

Data-mining Round-Trip Time Measurements for Dynamic Inter-domain Traffic Engineering

Context

With BGP (Border Gateway Protocol) multi-homing, a network is connected to the Internet via multiple transit providers. This solution is generally advocated for bringing enhanced connection reliability and improved traffic performance, thus is widely deployed in a variety of large networks, such as enterprise networks, CDN (Content Delivery Networks), ISPs (Internet Service Provider), etc.

In order to actually take advantage of the multiple paths that become available, the best current practice proposes dynamically choosing the best route based on network measurements such as Round-Trip Time (RTT) and packet loss [1, 2, 3]. This project intends to analyze these measurements and provide the networking community with data-based insights for traffic engineering, along with exploitable tool set.

Objectives

The candidate is expected to explore the statistic properties of network measurements with curiosity and rigorousness.

The candidate is then encouraged to study, propose and implement, with guidance, methods analyzing RTT time series in both offline and online manner. A demo is already available on github https://github.com/WenqinSHAO/path_change_alert/tree/servemode and servers as the entry point for the project. The relationship between RTT variation and network events, such as congestion and path change, are of main interest.

Benefits

The candidate will have the chance to:

- learn and practice a statistic approach in discovering and solving networking problems;
- participate in the biggest internet measurement platform RIPE Atlas;¹
- learn and master essential tools in network engineering and data exploration;
- practice and improve communication skills for technical and scientific exchange.

Requirements

- Know some statistics;
- Want to try some machine learning;
- Not afraid of coding;
- Capable of learning new stuff by his/herself, even without textbook.

Contact

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References

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- [2] David K. Goldenberg, Lili Qiuy, Haiyong Xie, Yang Richard Yang, and Yin Zhang. Optimizing cost and performance for multihoming. *ACM SIGCOMM CCR*, 34(4):79, oct 2004. ISSN 01464833. doi: 10.1145/1030194.1015478. URL <http://dl.acm.org/citation.cfm?id=1030194.1015478>.
- [3] Wenqin Shao, Luigi Ianonne, Jean-Louis Rougier, Francois Devienne, and Mateusz Viste. Scalable BGP Prefix Selection for Effective Inter-domain Traffic Engineering. *IEEE NOMS*, 2016.

¹<https://atlas.ripe.net>